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(54) Title: THIN FILMS, STRUCTURES HAVING THIN FILMS, AND METHODS OF FORMING THIN FILMS

(57) Abstract: The invention described herein relates to new titanium-comprising materials which can be utilized for forming tita-
nium alloy barrier layers for Cu applications. Titanium alloy sputtering targets can be reactively sputtered in a nitrogen-comprising
sputtering gas atmosphere to form titanium alloy nitride film, or alternatively in a nitrogen-comprising and oxygen-comprising at-
mosphere to form titanium alloy oxygen nitrogen thin film. The thin films formed in accordance with the present invention can
contain a non-columnar grain structure, low electrical resistivity, high chemical stability, and barrier layer properties comparable or
exceeding those of TaN.

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